

Federal Water Resources Planning
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From its earliest days, the United States embodied an optimistic vision of economic expansion, one largely done through individual efforts and entrepreneurial endeavor. This vision also reflected a fundamental distrust of government; power and liberty, so it was argued, were incompatible. As a consequence, Americans drafted a Constitution whose dispersion of authority amazed visitors from abroad. So far as public works were concerned, the role of the federal government was limited, but in his 1808 "Report on Roads and Canals," Secretary of Treasury Albert Gallatin pointed out that the national government alone had the ability and resources to construct certain ambitious, but necessary, projects.

Gallatin provided an enduring justification for federal involvement by insisting that the resulting economic benefits were "annual additional income to the nation," a phrase that echoes the currently favored term, "national economic development." However, many Democrats argued at the same time that beneficiaries and users should pay much, if not all, of the project's costs. In the long run, ante-bellum construction did not so much depend on economic benefits as on "willingness to pay". This changed only when local communities, exploiting the ascendancy of the Whiggish Republican party after the Civil War, successfully convinced Congress to open the federal treasury to hundreds of public works improvements, including a substantial number of river and harbor projects of mainly local benefit. Proponents of these projects continued to justify the work on the basis of national economic benefit, or some similar expression, but the number of skeptics grew.

During the Progressive Era (1890-1920), professional experts, including engineers, attempted to apply supposedly scientific laws and empirical research to solve social problems and environmental issues, including natural resources exploitation. The concept embraced the idea of multipurpose river development. President Theodore Roosevelt articulated the new position most clearly: "Works designed to control our waterways have thus far usually been undertaken for a single purpose, such as the improvement of navigation, the development of power, the irrigation of arid lands, the protection of lowlands from floods, or to supply water for domestic and domestic and manufacturing purposes." The time has come, he went on, to merge local projects and uses into a comprehensive plan for the entire country. "Such a plan should consider and include all the uses to which streams may be put, and should bring together and coordinate the points of view of all users of water."

Multipurpose advocates did not disavow the importance of national economic development. Quite the reverse, they believed that the goal could best be

reached through maximum basin-wide river development. The less water "wasted" the better. Scientific efficiency, developed by professionals, would replace crude political calculations. This involved detailed examinations of agricultural development, urban expansion, and commercial and industrial growth. Climate, soil conditions, hydrographic data, forestation, and animal life needed to be taken into account. Experts of all kinds were needed. The emphasis on multipurpose management implied a "systems approach" to management. River basin development was an exercise in natural resources exploitation that mimicked the mining, manufacturing and distribution systems of large automobile or petroleum companies, where everything was controlled from extracting the resource through fashioning the final product. All these various systems emphasized scientific efficiency and often significantly affected regional and possibly national social activity and well-being.

The use of river basins to define natural resources regions is not simply a consequence of the vital importance of water. It is also a matter of convenience. Of all natural resources, water has the clearest aerial identify. Topographers can precisely measure a drainage basin, and water, unlike lumber or extractive minerals, is generally not transported over long distances. Both the ability to define unambiguously the resource region and the escalating claims on water in the twentieth century helped promote the use of river basins as the natural resource decision arena. In the New Deal of Franklin Delano Roosevelt, the Tennessee Valley Authority became the prototype of multipurpose, river basin planning.

Many New Deal water resource plans were never utilized, but they offered the opportunity to identify and address fundamental issues relating to water resources development, especially the relation between land and water and between the environment and human welfare. Water projects also posed the problem of balancing national and local needs, an especially sensitive issue during economic depression, as planners and politicians debated the appropriate role of the federal government in regional development. Many congressmen and local politicians rejected out of hand any attempts to impose solutions from Washington, although their objections often became distant murmurs when the federal government offered to pay for, as well as construct, the project.

Although increased emphasis on basin-wide analysis after World War II caused federal water agencies to increase the number of social scientists on their staffs, political realities prevented the realization of comprehensive river basin planning. The Bureau of the Budget remained suspicious of the Water Resources Council, established in 1965 partly to oversee the development of river basin plans, and did not always cooperate. Commission heads did not exert strong regional leadership, federal agencies disagreed about procedures, the number of council meetings declined, and the council never was accepted as a "court of last resort" for basin concerns. Local support also dwindled as people became more concerned with urban water supply, wastewater treatment and environmental

problems. Finally, strains on the federal budget precluded appropriations for large water projects and contributed to the splintering of traditional water resource constituencies. In November 1981, President Ronald Reagan abolished the six river basin commissions. One year later, he dismantled the Water Resources Council.

Politics aside, advocates of river basin planning may have insufficiently appreciated the difficulty of turning a natural resources region, no matter how well-defined, into an administrative entity. Political and natural resource boundaries are usually not conterminous, and the specific combination of natural resources produces problems of quality and quantity that vary from region to region. Political coordination becomes difficult, and local conditions always modify generic answers to resource questions. Success depends on accurately defining problems, developing priorities, and finding solutions that can actually be implemented. To do this successfully requires that planners predict and measure a large number of diverse costs and benefits involving economic, institutional, social, and environmental developments. Unfortunately, there is little in the record to suggest that planners do this particularly well. Consequently, political and financial factors often overwhelm the planning process. As a concept that addresses all potential functions, rather than simply attempting to identify all significant constituencies, comprehensive river basin planning remains elusive.

The application of scientific efficiency within a watershed works relatively well when the focus is on water control, whether it be navigation, flood control, hydropower, or irrigation. However, when other economic and social issues are addressed, scientific efficiency becomes increasingly less certain. Its place is taken by a new model, economic efficiency, and in the twentieth century the benefit-cost ratio has been the measure of economic efficiency in water projects. The Corps of Engineers began calculating benefits in the 1920s, but it was only in the 1936 Flood Control Act that Congress formally required benefit-cost ratios. The act specified that benefits "to whomsoever they accrue" should be ascertained, a requirement that enabled planners to consider an area much larger (or smaller) than the watershed to justify multipurpose development.

It's worthwhile reminding ourselves at this point that government economic efficiency is not the same as private sector efficiency. The corporation president assesses benefits in terms of costs and profits accruing to the firm. The government analyzes the investment in terms of all costs and gains, including those charged to third parties. Both economic and social impacts become more difficult to formulate, let alone address. Again, the difference was appreciated early in the industrial age. Adam Smith, whom Albert Gallatin greatly admired, wrote in *Wealth of Nations* that government should construct public works when these works are "of such a nature, that the profit could never repay the expense of any individual or small number of individuals, and which it therefore cannot be expected that any individual or small number of individuals should erect or maintain."

Guidelines for benefit-cost calculations came slowly. In 1950, a subcommittee of the Federal Inter-Agency River Basin Committee (FIARBC or "Firebrick") published a report on Proposed Practices for Economic Analysis of River Basin Projects, more commonly called the Green Book, that recommended procedures for evaluating benefits and costs of water projects. In general, it applied classical welfare economics, with its emphasis on market preferences, to national water resources development. It addressed national benefits and costs for irrigation, flood control, navigation, and power, but did not develop procedures to analyze income distribution, environmental impacts, or regional benefits and costs. While controversial in its details, the publication reflected traditional benefit-cost analysis and its focus on maximizing economic efficiency or, in national terms, on producing "annual additional income to the nation". In response, political scientists warned that rational water allocation required political as well as economic calculations.

This last point was examined explicitly at Harvard University, where in 1955, professors Arthur Maass and Maynard Hufschmidt established the Harvard Water Program, a multidisciplinary research and training program to develop new methodological techniques in water resources planning. In 1962, the program's major participants published *Design of Water Systems*, a work that influenced the approach to the planning and design of river basin systems during the next decade. The study proposed a new approach to economic evaluation--multi-objective analysis.

Not to be confused with multipurpose planning, which focuses on irrigation, flood control, navigation, etc., multi-objective analysis addresses actual social objectives, such as income generation, food or industrial production, and regional development. More important, unlike traditional benefit-cost analysis, which always maximizes economic efficiency, multi-objective analysis designs water systems to address all the objectives sought by the planners, including non-economic values such as environmental quality or preserving a well-established ethnic neighborhood. The method recognizes that, after all the computer simulations have been run and mathematical models constructed, the ultimate decision must rest in the political sphere. Politicians (or planners) must choose the objectives in the first place and select among various options in the end. Tradeoffs are necessary. This is an economic efficiency model that ideally involves the full participation of potentially affected parties and which identifies the region that offers the optimum opportunities for achieving the public's objectives.

In Section 209 of the 1970 Omnibus Water Resources Act (P. L. 91-611), Congress formally embraced multi-objective planning and specified four objectives for federal water projects: regional economic development, environmental quality, social well-being, and national economic development. The Water Resources Council developed the Principles and Standards (in the

Reagan years changed to Principles and Guidelines) to guide agencies in the use of the approach. While today multi-objective planning remains the core of federal water resources planning, considerable debate still exists on appropriate methodologies and analytical tools to execute the approach. Benefit-cost analysis, in particular, remains a legally required but increasingly suspect tool. Its use to quantify, not only market preferences, but incommensurable, non-market, values, such as recreation, historic preservation, or aesthetic enjoyment, injects rigor and organization into the planning process but arguably renders citizen participation unnecessary.

Meanwhile, we have timorously entered a new era in planning. Replacing both the scientific efficiency model of the early twentieth century and the more recent economic efficiency model is an approach that I can characterize only as planning by constraints. The process emphasizes regulation and focuses on water quality, rather than quantity, issues. Rather than maximizing economic efficiency or optimizing the opportunity to meet public objectives, it sets limits to growth. To what extent it remains basically an anthropocentric process, in which sustainable development is justified economically as well as morally, or reverts to a bio-centric ethic which grants to other living things a moral worth equal to that of the human population, is a great question. Certainly, any process that grants inherent moral worth to nonhumans establishes a system of competing claims that ultimately sets limits on human population, patterns of consumption, and technological development. Any equitable solution to these problems of competing claims with nonhumans would require the application of a system of ethics and a notion of justice that substantially modifies the value system of western civilization.

This new planning world compels us to ask many questions and share some very real concerns. Can benefit-cost methodology address ethical values or, to turn the question around, can benefits and costs be weighted according to ethical criteria? Are moral obligations to be assigned values that somehow are commensurable, and who is to determine these values (government, a public-private sector committee, an "ethics court", etc.)? In short, does quantification work? Can decision arenas identified primarily in terms of water control or market preferences be used in a meaningful way to adjudicate competing claims between nature and civilization? Finally, to what extent are planning approaches that emphasize "watershed management" or "ecosystem management" simply old concepts in new clothing? It is easy for historians to ask the questions, but much harder for us to supply the answers. Clearly, however, the muse of history is a teacher worth heeding.